

LPC# 009 065 0003 - Madison County
Magnesium Elektron - Madison
ILN000510839
SF/HRSI

Preliminary Assessment



Prepared by:
Office of Site Evaluation
Division of Remediation Management
Bureau of Land

SIGNATURE PAGE

Title: CERCLA Preliminary Assessment for Magnesium Elektron

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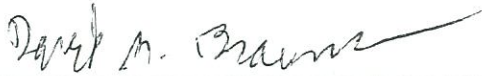


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5/3/16

Date

Approval: David Brauner, Site Assessment Manager, United States Environmental
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Signature

5/2/16

Date

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Preliminary Assessment Report

for:

Magnesium Elektron

Madison, IL

LPC119650003

ILN 000 510 839

PREPARED BY:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

BUREAU OF LAND

DIVISION OF REMEDIATION MANAGEMENT

OFFICE OF SITE EVALUATION

August 31, 2015

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SECTION 1.0 Introduction

On March 10, 2014, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S. EPA) to conduct a Preliminary Assessment (PA) at Magnesium Elektron on 1001 College Street, Madison, Madison County, IL (38.68403/-90.1678).

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300) requires that a Preliminary Assessment be performed on all sites entered into the Comprehensive Environmental Response, Compensation, and Liability System (CERCLIS), which was subsequently replaced by SEMS (Superfund Enterprise Management System).

A Preliminary Assessment is an early step in the Superfund process that utilizes a limited-scope investigation and collects readily available information. The Preliminary Assessment distinguishes between sites that pose little or no threat to human health and the environment and those that require further investigation. The Preliminary Assessment also supports emergency response and removal activities, fulfills public information needs, and generally furnishes appropriate information about the site early in the assessment process.

If the findings of the Preliminary Assessment determine that further investigation is warranted, the site will continue to progress through the Superfund evaluation process and receive a Site Inspection. The Site Inspection will provide necessary information that will help determine if the site qualifies for possible inclusion on the National Priorities List (NPL) or should be archived and receive a No Further Remedial Action Planned (NFRAP) qualifier. At any time throughout the Superfund evaluation process, the site may be assigned NFRAP status, be referred to another state or federal clean-up program, or recommended for another action. The Preliminary Assessment is performed under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) commonly known as Superfund.

SECTION 2.0 Site Background

Section 2.1 Site Description

The facility consists of approximately 40 acres, 32 of which are enclosed by buildings. The site is located in an industrial area surrounded by residences, apartments, and other commercial enterprises. There are residential homes located with 200-250 feet from the site. Benard Long

Elementary School is located 0.1 miles east of Magnesium Elektron on College Street. The site is located in Section 26, Range 10 West, and Township 3 North.

The Site consists of multiple large, interconnecting buildings. Building 6, where the uranium contamination was previously identified, is near the center of the complex. The southwest end of Building 6, where the uranium rod extrusion and straightening operations were performed, adjoins Building 4; there are no physical barriers between these two buildings. Building 6 is approximately 275 ft wide and 1000 feet in length. Ceilings of the main bays of Buildings 6 and 4 are approximately 46 ft high with the ceilings reaching approximately 60 ft at the highest point along the centerlines of the buildings. Basic structure support consists of steel columns on approximately 25 foot centers, connected by large horizontal beams and multiple smaller vertical and horizontal cross members. Horizontal overhead surfaces are dust covered, thus limiting the sensitivity and accuracy of direct measurements of radioactivity on such surfaces.

Walls are concrete block with brick veneer. Floors are concrete; with rough, and pitted surfaces. Much of the floor in the vicinity of the extrusion press is covered with a thin layer of oily dirt and fine metal debris. There are no floor drains in Buildings 6 and 4, but there are multiple utility trenches, lubrication pits, equipment supports, and other penetrations into the floor. Machinery, feed materials, and product occupy a significant portion of the floor space.

The buildings have multiple access points for personnel and equipment. There are flat roof surfaces in the vicinity of the ceiling windows. These roofs have drains, which discharge into a plant-wide storm runoff drainage system.

The site is currently owned and operated (since 2013) by Magnesium Elektron (a Luxfer Group Company). Magnesium Elektron North America (MENA), headquartered in Madison, Illinois, has three sites that supply magnesium plate, sheet and coil for commercial, aerospace, defense and graphic arts applications. MENA has the world's largest magnesium rolling operation, which includes four rolling mills, one of which is the largest of its kind in the world.

The site is surrounded by a maintained barbed wire fence. The site is covered with grass and concrete/asphalt and gravel roads. Surface water drainage is handled by the Metro East Sanitary District system. Drinking water for the City of Madison is supplied by the Illinois American Water Company, which uses the Mississippi River for the source of drinking water.

There are no known wetland areas near the site or in the surface water pathway.

Section 2.2 Site History

Based on the sources reviewed, the site was originally developed as early as 1942 by the General Steel Casting Armor Plant and the Defense Plant Corporation for the production of tank turrets.

Following the end of World War II, the Standard Steel Spring Company, George A. Fuller Company, and Defense Plant Corporation jointly operated the casting facility until the late 1940s. At this time, steel casting activities were abandoned and the plant remained vacant until its acquisition by the Dow Chemical Company. Dow Chemical Company owned the facility in the early 1950s and began the current magnesium and aluminum manufacturing operations in approximately 1954. Dow operated the facility until 1969 at which time it leased the facility to Phelps Dodge Corporation. Phelps Dodge Corporation subsequently formed a partnership with Alusuisse, purchased the facility, and continued operations as the Consolidated Aluminum Company. In 1986, Spectrulite purchased the facility. Spectrulite used the facility to cast magnesium and thorium. Magnesium Electron became the property holder in 2013; it supplies magnesium alloys, powders, and product.

According to the U.S. Army Corp of Engineers, Dow Chemical worked with Mallinckrodt Chemical Company to process uranium metal for the U.S. Atomic Energy Commission (AEC). The work was conducted on an extrusion press and straightening table located near the southwest end of Building 6. Records suggest that the total quantity of uranium involved in these operations was small and indicate that Mallinckrodt retained accountability for the uranium through the operations. Mallinckrodt was also responsible for removing unused uranium material and cleaning up facilities following operations. Detailed records describing the previous cleanup have not been located (Remedial Investigation Report and Feasibility Study for the Madison Site, US Army Corps of Engineers, January 2000). Prior to 1998, the US Department of Energy (DOE), successor to AEC (US Atomic Energy Act), performed evaluations of previously used sites, where a potential for residual radioactive contamination was considered to exist. These evaluations were performed as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). Because of the lack of documentation to establish the radiological status of the Madison Site, a preliminary radiological survey was conducted in March 1989 by Oak Ridge National Laboratory (ORNL), under contract to DOE. That survey identified low concentrations of uranium in dust on overhead structures, but concluded that this residual radioactive material did not pose a potential for significant radiation exposure to current building occupants. The report recommended further investigations to better define the extent of uranium contamination.

A more detailed radiological survey of the facility was performed in 1998 under the US Army Corps of Engineers' (ACE) Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of this survey was to determine the current conditions of the site and compare these conditions with appropriate radiological guidelines. It consisted primarily of measurements in the vicinity of the extrusion press and straightening table to determine the uranium activity levels on floors and walls; uranium levels on equipment surfaces; and concentrations of uranium in dust accumulated on overhead building surfaces. In addition, direct radiation levels and uranium contamination were measured at Building 6 and 4 exit and entrance locations, on the roof above the extrusion press, and on other surfaces in Buildings 6 and 4.

The survey identified detectable uranium in dust on overhead surfaces, with the highest concentrations occurring directly above the extrusion press. The evaluation of the concentrations detected demonstrated that the potential radiological risk to current production workers, posed by this residual uranium, is within the range recommended by the Environmental Protection Agency. However, based on assumed use, the evaluation found that utility workers conducting activities in close proximity to overhead structures could experience unacceptable exposure from the contaminated surfaces. In addition, average dust concentrations on overhead surfaces exceed the State of Illinois total activity surface contamination guideline of 1,000 dpm/100 cm² as well as the total activity guideline established in US Nuclear Regulatory Commission Regulatory guide 1.86 for natural uranium.

Although floor surfaces in the vicinity of the extrusion press did not have surface activity exceeding acceptable levels, collection of additional data will be necessary after remediation to fully quantify surface activity and perform statistical tests to demonstrate compliance with the Record of Decision for the site.

A small area of elevated direct radiation was noted outside one of the doors. Although the source of this radiation was not identified by the measurements conducted during the initial survey, a further investigation found that this contamination results from magnesium-thorium operations rather than from AEC operations.

The uranium is due to past operation by Dow and Mallinckrodt in support of the AEC. The facility also processed thorium under US Nuclear Regulatory Commission (NRC) and State of Illinois licenses. Several items containing thorium and small amounts of thorium in dust samples were noted in Building 6 by the ORNL survey. The thorium is the result of processing magnesium-thorium alloys.

As Spectrulite, the site generated several different waste streams. The hazardous wastes included waste flammable solids, waste flammable liquid, mercury waste, lab packs, and off-specification and out of date products. Waste flammable liquid consists of waste paint and thinner from the photoengraving plate coating process. Mercury waste is generated from the repair of mercury switches on the furnaces. Waste mercury was not a regularly generated waste. The last shipment of waste mercury was made on April 8, 1996.

The special wastes generated by Spectrulite included used oil/water mixture, used oil/absorbent mixture, aluminum refractory waste and polychlorinated biphenyls (PCB) contaminated waste. Used oil/water mixture includes water soluble cooling oil from the extruding process, water and oil pumped from the basement, used oil from hydraulic leaks, oil from fork trucks and other equipment. Spectrulite can generate between 3,000 and 15,000 gallons of oily water per month. The used oil/absorbent mixture waste stream is made up of material used to soak up oil leaks and spills. PCBs are generated from the retrofitting of high voltage transformers. These oily wastes were manifested as special waste to Milam Landfill in East St. Louis, Illinois.

Currently under Magnesium Elektron, only magnesium alloy casting and processing is conducted at this facility. Magnesium Elektron purchases 25 pound ingots. The ingots are cast in one of two lines. Each of the two lines uses 10 pots for melting, fluxing (adding additional metals to give the alloy its desired properties) and refining. The first line produces magnesium alloy slabs. The second line produces magnesium alloy billets.

As the result of these operations several waste streams are generated. They include waste paint (back coating line), solvent soaked rags, aerosol cans, used oil and oily wastes, floor sweepings, swarf solids (turnings) and diatomaceous earth, lab wastes and fluorescent bulbs.

Section 2.3 Regulatory Status

Based upon available file information, Magnesium Elektron does appear to be subject to Resource Conservation and Recovery Act (RCRA) corrective action authorities. The site is listed in the USEPA RCRAInfo database as a conditionally exempt small quantity generator. (http://oaspub.epa.gov/enviro/rcrainfoquery_3.facility_information?pgm_sys_id=ILD982205544). The date of the last RCRA inspection was August 20, 2009.

Magnesium Elektron is also regulated by the Clean Air Act (1711900113). Information contained in Integrated Compliance Information System (ICIS) -Air contains compliance and permit data for stationary sources of air pollution regulated by EPA, state and local air pollution agencies. Information contained in ICIS-Air is used by the states to prepare State Implementation Plans (SIPs) and to track the compliance status of point sources with various regulatory programs.

The site was under the authority of the Atomic Energy Act. In 1989, the Department of Energy conducted a radiological survey at the facility. Low levels of uranium were identified in residual dust on portions of the facility's structural frame-work. DOD subsequently completed a comprehensive cleanup of all contaminated dust. A letter was produced from the Department of Army to Spectrulite (2000) certifying completion of remedial activities, as well as the "Post – Remedial Action Report for the Madison FUSRAP" prepared by the US Army Corps of Engineers dated September 2000.

Information currently available does not indicate that the site is under the authority of Uranium Mine Tailings Action (UMTRCA), or the Federal Insecticide Fungicide or Rodenticide Act (FIFRA).

SECTION 3.0 Field Inspection Activities

Section 3.1 Field Inspection

On October 22, 2015, Illinois EPA conducted a reconnaissance inspection of Magnesium Elektron located at 1001 College Street in Madison, Illinois. Magnesium Elektron took over

operations at this location on August 13, 2003. I was given a short tour of the facility, and the processes of the operation were explained.

Only magnesium alloy casting and processing is conducted at this facility. Magnesium Elektron purchases 25 pound ingots. The ingots are cast in one of two lines. Each of the two lines uses 10 pots for melting, fluxing (adding additional metals to give the alloy its desired properties) and refining. The first line produces magnesium alloy slabs. The second line produces magnesium alloy billets.

As the result of these operations several waste streams are generated. They include waste paint (back coating line), solvent soaked rags, aerosol cans, used oil and oily wastes, floor sweepings, swarf solids (turnings) and diatomaceous earth, lab wastes and fluorescent bulbs.

Section 3.2 Analytical Data

No analytical samples were collected for this investigation.

Section 3.3 Past Environmental Investigations

On December 11, 1989, Spectrulite informed the agency of a gasoline release when two tanks were removed from the ground. Over the course of 20 years, six other tanks were removed. They had reportedly contained: gasoline, kerosene, turpentine, used oil, cutting oil, motor oil, and heating oil. These tanks were removed and the soil and groundwater sampled and remediated with Illinois EPA oversight. A No Further Remediation letter was issued on June 17, 2010.

In 1989, the U.S. Army Corps of Engineers (USACE) found low concentrations of residual uranium contamination in two onsite buildings in the overhead structures. In 1992, the site was added to the US Army Corp of Engineers, Formerly Utilized Sites Remedial Action Program (FUSRAP).

In 1999, the USACE developed a Characterization Report for the site and samples were taken. It was found that there was radiological contamination on the overhead surfaces of two of the buildings. The floors and equipment of the site were below levels of contamination.

In 2000, USACE selected the "Decontamination of Accessible Surfaces" to be the remediation alternative for the site.

DOE completed a comprehensive clean-up of all contaminated dust. ENVIRON reviewed both a letter from the Department of the Army to Spectrulite (2000) certifying completion of remedial activities, as well as the "Post-Remedial Action Report for the Madison FUSRAP" prepared by the US Army Corps of Engineers, dated September 2000.

In the 2002, the site was removed from the FUSRAP and transferred to the Department of Energy.

Spectrulite contractor PANGEA Corp. performed comprehensive surveys of remaining rafters, the dross storage area, drains and outside surfaces in 2004. In 2006, initial decommissioning efforts generated 705 tons of thorium waste that was shipped for disposal at Envirocare of Utah. Secondary decommissioning activities were completed generating an additional 219 tons of thorium waste. In May of 2007, Illinois Emergency Management Agency's (IEMA) Division of Nuclear Safety performed post remedial verification surveys concurrently with on-site decommissioning activities. Areas covered included the dross storage area, rafters and exterior soil contamination. Spectrulite was required to comply with IEMA surface release limits. Radiological conditions at the site met applicable release limits. Final report was delivered in February 2008.

On October 4, 2010, Magnesium Elektron experienced an explosion and a fire at their facility. Magnesium oxide particles were dispersed into the air. The events were started by one of the coil reheating furnaces. A water line ruptured and the water came into contact with molten magnesium furthering the events. The facility was inspected by IEPA Bureau of Air and Office of Emergency Response. Samples were negative for asbestos. The site was recommended to the State of Illinois Attorney General's Office for violations. There is no indication that this enforcement action was pursued.

SECTION 4.0 Pathway Discussions

Section 4.1 Groundwater

Potable water at the site is provided by the Illinois American Water Company. A ground water production well (the disused "Ranney well") is only domestic water supply within a 1-mile radius of the facility. Four monitoring wells were installed during the UST remediation in 1992. These four wells were sampled and analyzed for BTEX (benzene, toluene, ethyl benzene and xylene) constituents. Results indicated elevated levels of all of the BTEX constituents in wells 1 and 4, all four contaminants were above maximum contaminant levels. A No Further Remediation letter was issued on June 17, 2010. This NFR indicates stipulations against the site concerning groundwater (groundwater will not be used as a potable water supply). Shallow groundwater in the local area is approximately 20 feet below ground surface. Based on local topography, shallow groundwater beneath the site likely flows in a westerly direction toward the Mississippi River.

Storm water runoff at the site discharges into storm drains located site-wide. This drainage is treated at the Granite City Sewer Treatment facility.

There are no known targets being impacted by the groundwater pathway. The groundwater pathway is of little concern at this site due to potable drinking water for the area being supplied by the Illinois American Water Company, which uses the Mississippi River as its source.

Section 4.2 Surface Water

Storm water runoff at the site discharges onto storm drains located site-wide. This drainage is treated at the Granite City Sewer Treatment facility. The surface water pathway is not complete.

Based on a review of the USGS topographic map for the Granite City, Illinois-Missouri quadrangle, ground elevation at the site is approximately 475 feet above mean sea level. The surrounding topography is relatively flat. There are no on-site surface water bodies. The nearest surface water is the Chain of Rocks Channel (at its confluence with the Mississippi River), which is located approximately 1 mile west of the site at its closest point. There are wetlands along both sides of the Chain of Rocks Channel and along the Mississippi River. There is no information concerning fishing the Chain of Rocks Channel. The Mississippi River is a documented fishery. Facility personnel have indicated that there have been no known occurrences of flooding at the site. The facility is not located within the 100 or 500 year flood plain, presumably due to the extensive levee system along the Mississippi River.

There is a surface water intake present approximately 3.22 miles from the confluence of Chain of Rocks Channel and the Mississippi River. The name of this intake is IAWC East St. Louis. It should be noted that there is not an established surface water pathway from the site to the Mississippi River.

The surface water pathway is of little concern at this site as surface water from the site is directed to the sanitary system for the City of Granite City. There is not a viable pathway for any contaminants that may be present on site to migrate to the nearby Mississippi River. There are no known designated wetlands that are being impacted from the operations or possible contaminates from this facility.

Section 4.3 Soil Exposure

The site is currently active and is surrounded by a maintained fence with a gated entrance with guard. The site consists of approximately 1,400,000 square feet of indoor manufacturing floor space, centrally located on the property, which includes raw material storage, casting, extrusion, rolling, finishing, maintenance, laboratory, and office operations. The area north of the building complex is a mixture of asphalt-paved, gravel, rail-spurs and over-grown land. Asphalt paving also extends along the western edge of the building with the remnants of a former propane tank farm beyond. A plant roadway adjoins the eastern edge of the production facility along with one of the facility's cooling towers. The plant office and laboratory building, as well as an employee parking lot, are located on the property's southern boundary. Unimproved areas on site are covered with grass and/or over-grown vegetation.

Distance	Population
0-1/4 mile	649
1/4-1/2 mile	668
1/2 – 1 mile	2,489
1-2 miles	8,915

2-3 miles	19,600
3-4 miles	34,393

Undeveloped land is present to the north of the facility, beyond which is industrial development. Residential houses and a remediated tract of land that is currently vacant (historically part of the subject site) are located to the east. Residential neighborhoods occupy the land to the south. Illinois State Highway 3, with the Marvin Price Army Depot beyond, borders the western property line.

At this time the facility employs approximately 100 people.

Section 4.4 Air Pathway

Magnesium Elektron is currently being permitted through the IEPA Bureau of Air.

The Magnesium Elektron facility has been investigated by the IEPA BOA as recently as March 7, 2013, where it was found to be in violation of allowing the present coatings exceeds the allowable limits in the regulations for extreme performance coatings. An enforcement action through the Illinois Attorney General's Office was filed in Madison County Illinois in September 2014.

Past operations at the facility may have allowed magnesium, uranium, and thorium to become airborne and travel outside the facility. Sampling of the buildings and exits near the production area of the radioactive materials identified low levels of radiation which were remediated as documented in the Post-Remedial Action Report for the Madison FUSRAP, September 2000.

Distance	Population
0-1/4 mile	649
1/4-1/2 mile	668
1/2 – 1 mile	2,489
1-2 miles	8,915
2-3 miles	19,600
3-4 miles	34,393

Section 5.0 Summary

On May 25, 2015, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S. EPA) to conduct a Preliminary Assessment (PA) at Magnesium Elektron on 1001 College Street, Madison, Madison County, IL (38.68403/-90.1678). Potential contaminants of concern included uranium 234, polychlorinated biphenyls, manganese and mercury.

Through the soil exposure pathway, there is a possibility that contaminants from plant operations may be present in the onsite soils. These contaminants may impact current and future workers if they come into contact with these contaminants.

There is the possibility that contamination has or could be dispersed from the air pathway. Remediation and regulation has addressed this potential threat, with continuing monitoring, this pathway would pose little threat to the surrounding population. At this time, the air pathway is being monitored and regulated by the Illinois EPA Bureau of Air.

The surface water pathway is of little concern at this site as surface water from the site is directed to the sanitary system for the City of Granite City. There is not a viable pathway for any contaminants that may be present on site to migrate to the nearby Mississippi River. There are no known designated wetlands that are being impacted from the operations or possible contaminates from this facility.

The groundwater pathway is of little concern at this site due to potable drinking water for the area being supplied by the Illinois American Water Company, which uses the Mississippi River as its source.

Section 6.0 References

Illinois EPA Bureau of Land Files. LPC 1190650003

Illinois EPA Bureau of Air Files. 119105AAH

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Illinois EPA. Pre-CERCLIS Screening Assessment. Magnesium Elektron. February 6, 2012.

Illinois EPA. Leaking Underground Tank No Further Remediation Completion. June 17, 2010.

Dames and Moore. Final Report, Removal of Magnesium Hydroxide Material From Stockpile and Former Die-Cleaning Areas. Spectrulite Consortium, Inc. Madison, Illinois. December 1, 1999.

Figure 1
Site Location Map

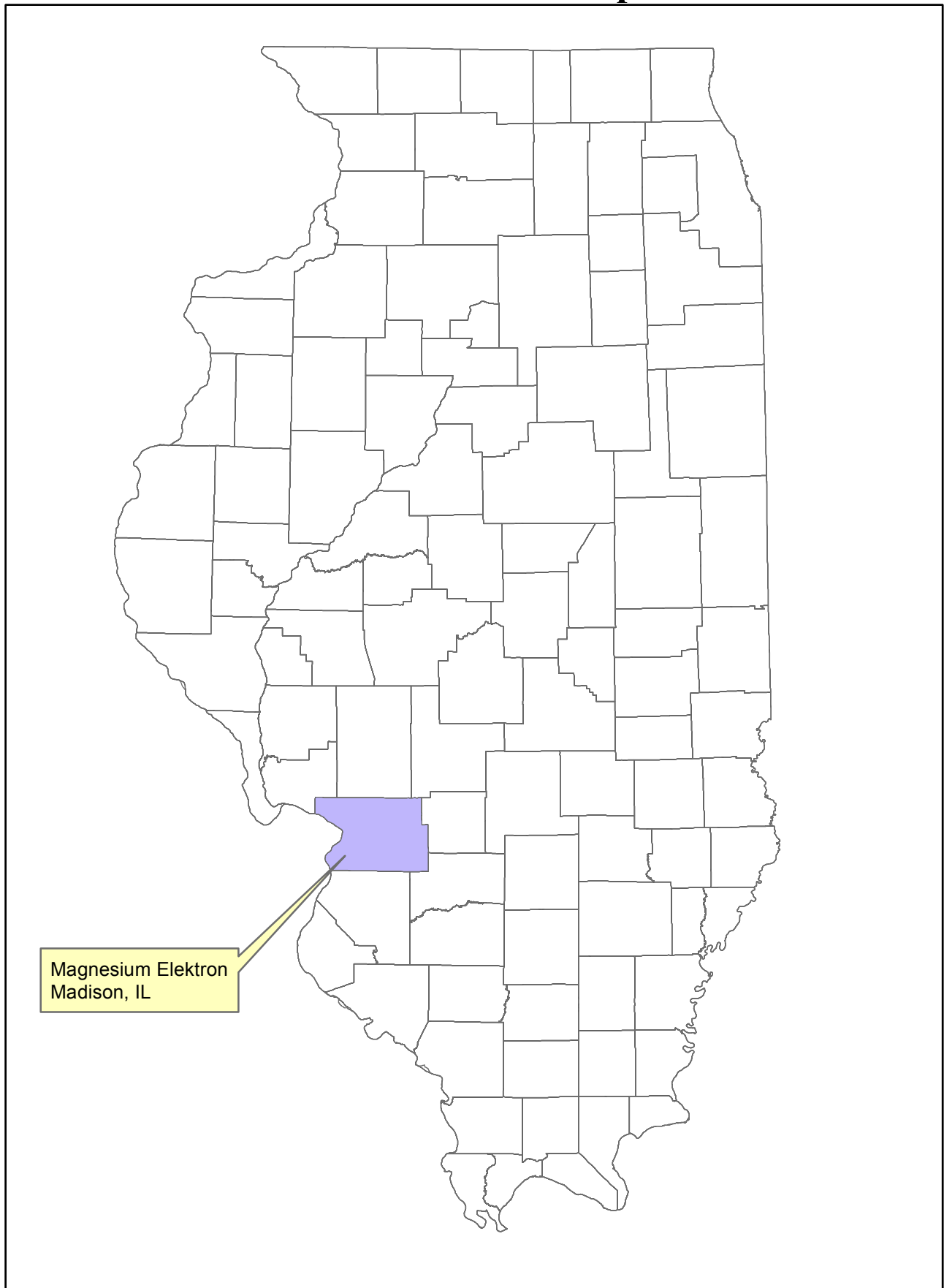


Figure 2
Site Topographic Map

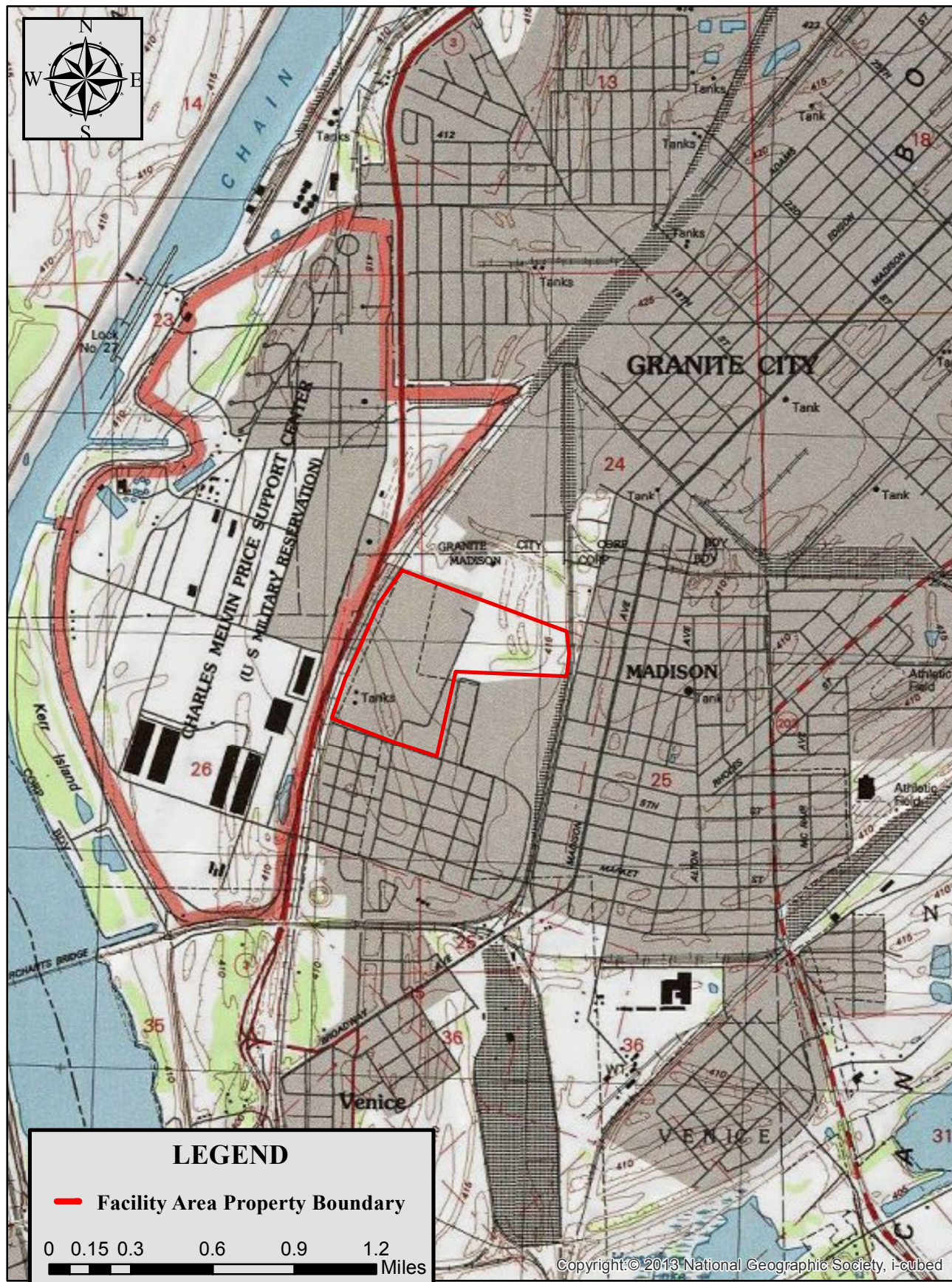


Figure 3
Aerial Photo



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.1 0.2 0.4 0.6 0.8 Miles



LEGEND

— Facility Area Property Boundary

0 0.175 0.35 0.7 1.05 1.4 Miles

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